



**ZXMN15A27K**

**150V N-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

$V_{(BR)DSS}$	$R_{DS(on)}$	$I_D$ $T_A = 25^\circ C$
150V	650mΩ @ $V_{GS} = 10V$	2.6A

**Description and Applications**

This MOSFET features low on-state resistance, fast switching and high avalanche withstand capability, making it ideal for high efficiency power management applications.

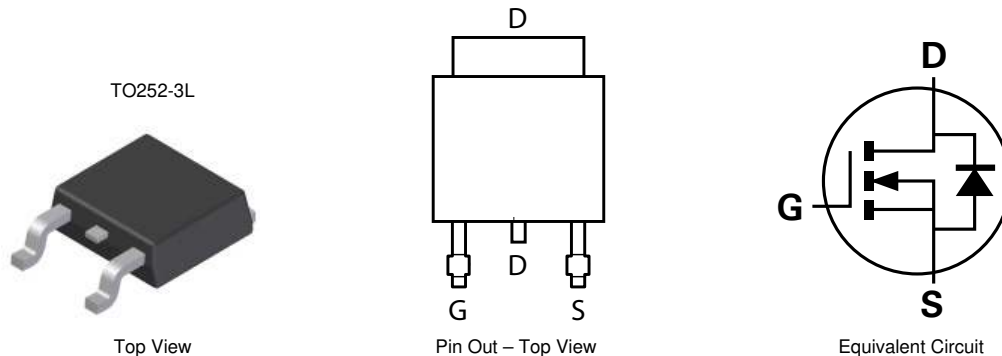
- SLIC line drivers for VoIP applications
- Transformer Driving Switch
- Power management functions
- Motor control
- Uninterrupted power supply

**Features and Benefits**

- 100% Unclamped Inductive Switch (UIS) test in production
- High avalanche energy pulse withstand capability
- Low input capacitance
- Low on-resistance
- Fast switching speed
- "Green" component and RoHS Compliant (Note 1)
- Qualified to AEC-Q101 Standards for High Reliability

**Mechanical Data**

- Case: TO252-3L
- Case Material: Molded Plastic "Green" Molding Compound, UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Matte Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.33 grams (approximate)

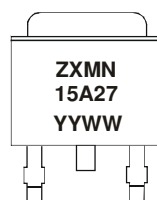


**Ordering Information (Note 1)**

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXMN15A27KTC	See Below	13	16	2,500

Notes: 1. Diodes, Inc. defines "Green" products as those which are Eu RoHS compliant and contain no halogens or antimony compounds; further information about Diodes Inc.'s "Green" Policy can be found on our website. For packaging details, go to our website.

**Marking Information**



ZXMN = Product Type Marking Code, Line 1  
 15A27 = Product Type Marking Code, Line 2  
 YYWW = Date Code Marking  
 YY = Last two digits of year (ex: 09 = 2009)  
 WW = Week (01-52)

**Maximum Ratings** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

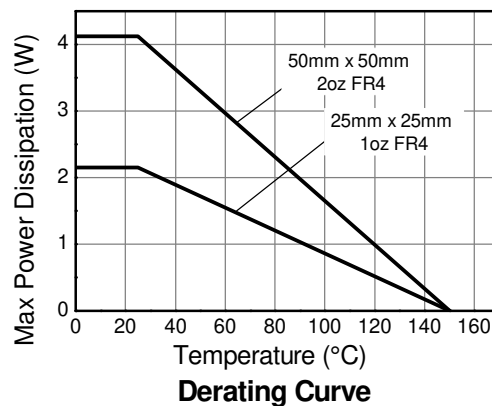
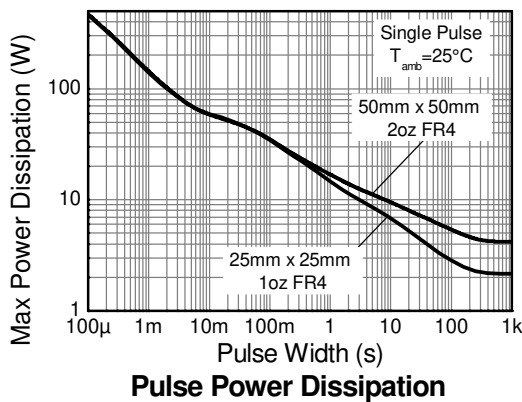
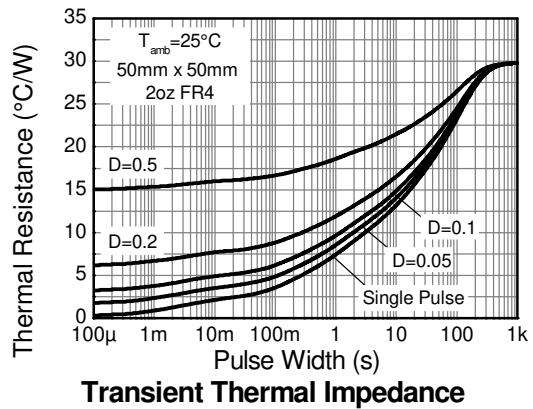
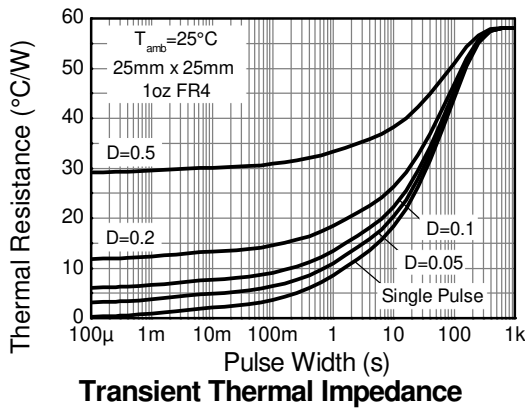
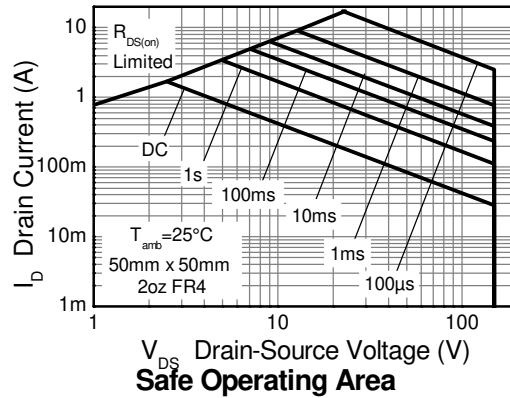
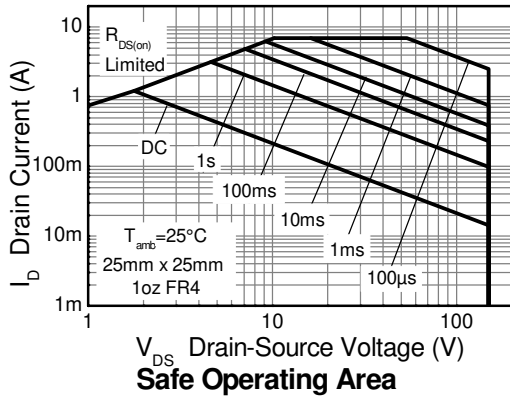
Characteristic		Symbol	Value	Unit	
Drain-Source voltage		$V_{DSS}$	150	V	
Gate-Source voltage		$V_{GS}$	$\pm 25$	V	
Single Pulsed Avalanche Energy	(Note 7)	$E_{AS}$	55	mJ	
Single Pulsed Avalanche Energy	(Note 7)	$I_{AS}$	4.3	A	
Repetitive Avalanche Energy	(Note 4)	$E_{AR}$	3.0	mJ	
Repetitive Avalanche Current	(Note 4)	$I_{AR}$	4.3	A	
Continuous Drain current	$V_{GS} = 10\text{V}$ $T_A = 70^\circ\text{C}$ (Note 3)	$I_D$	2.55	A	
			2.0		
			1.7		
Pulsed Drain current	$V_{GS} = 10\text{V}$ (Note 4)	$I_{DM}$	17.2	A	
Continuous Source current (Body diode)		(Note 2)	$I_S$	5.2	A
Pulsed Source current (Body diode)		(Note 4)	$I_{SM}$	17.2	A

**Thermal Characteristics**

Characteristic		Symbol	Value	Unit
Power dissipation Linear derating factor	(Note 2)	$P_D$	4.2	W mW/ $^\circ\text{C}$
			33.6	
	(Note 3)		9.5	
			76.0	
Thermal Resistance, Junction to Ambient	(Note 6)	$R_{\theta JA}$	2.2	$^\circ\text{C}/\text{W}$
			17.2	
	(Note 2)		30.2	
Thermal Resistance, Junction to Lead	(Note 3)	$R_{\theta JL}$	13.1	$^\circ\text{C}/\text{W}$
	(Note 6)		58.1	
Operating and storage temperature range		$T_J, T_{STG}$	-55 to 150	$^\circ\text{C}$

- Notes:
2. For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions. The device is measured when operating in a steady-state condition.
  3. Same as note 2, except the device is measured at  $t \leq 10$  sec.
  4. Same as note 2, except the device is operating in a repetitive state with pulse width and duty cycle limited by maximum junction temperature.
  5. Thermal resistance from junction to solder-point at the end of the drain lead.
  6. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition..
  7. UIS in production with  $L = 5.95\text{mH}$ ,  $I_{AS} = 4.3\text{A}$ ,  $R_G = 25\Omega$ ,  $V_{DD} = 100\text{V}$ , starting  $T_J = 25^\circ\text{C}$ .

**Thermal Characteristics**

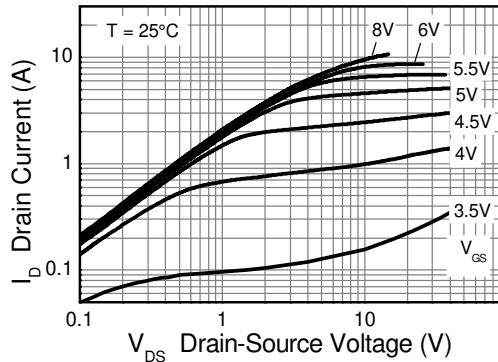


**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

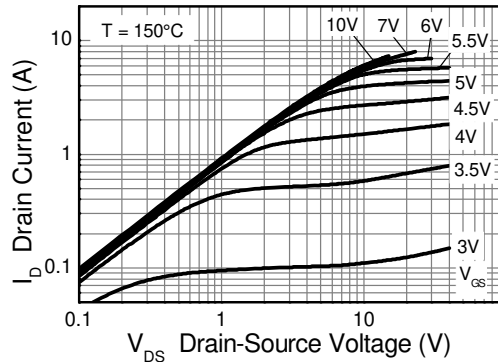
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	150	—	—	V	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	500	nA	V <sub>DS</sub> = 150V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±25V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	2	2.7	4	V	I <sub>D</sub> = 250μA, V <sub>DS</sub> = V <sub>GS</sub>
Static Drain-Source On-Resistance (Note 8)	R <sub>DS(on)</sub>	—	0.500	0.650	Ω	V <sub>GS</sub> = 10V, I <sub>D</sub> = 2.15A
Forward Transconductance (Notes 8 & 9)	g <sub>fs</sub>	—	2.8	—	S	V <sub>DS</sub> = 40V, I <sub>D</sub> = 2.15A
Diode Forward Voltage (Note 8)	V <sub>SD</sub>	—	0.880	0.950	V	I <sub>S</sub> = 4.3A, V <sub>GS</sub> = 0V
Reverse recovery time (Note 9)	t <sub>rr</sub>	—	153	—	ns	I <sub>S</sub> = 5.4A, V <sub>GS</sub> = 0V,
Reverse recovery charge (Note 9)	Q <sub>rr</sub>	—	1.1	—	μC	di/dt = 100A/μs
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	169	—	pF	V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V f = 1MHz
Output Capacitance	C <sub>oss</sub>	—	64.5	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	23.3	—	pF	
Total Gate Charge	Q <sub>g</sub>	—	6.6	—	nC	V <sub>DS</sub> = 120V, V <sub>GS</sub> = 10V I <sub>D</sub> = 5.4A
Gate-Source Charge	Q <sub>gs</sub>	—	1.0	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	3.4	—	nC	
Turn-On Delay Time (Note 10)	t <sub>D(on)</sub>	—	3.3	—	ns	V <sub>DD</sub> = 75V, V <sub>GS</sub> = 10V I <sub>D</sub> = 5.4A, R <sub>G</sub> ≅ 25Ω
Turn-On Rise Time (Note 10)	t <sub>r</sub>	—	12.7	—	ns	
Turn-Off Delay Time (Note 10)	t <sub>D(off)</sub>	—	17.1	—	ns	
Turn-Off Fall Time (Note 10)	t <sub>f</sub>	—	13.3	—	ns	

- Notes:
8. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%
  9. For design aid only, not subject to production testing.
  10. Switching characteristics are independent of operating junction temperatures.

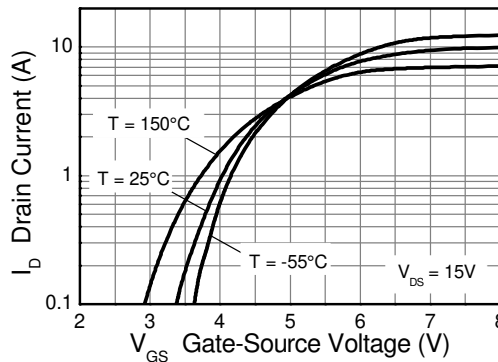
**Typical Characteristics**



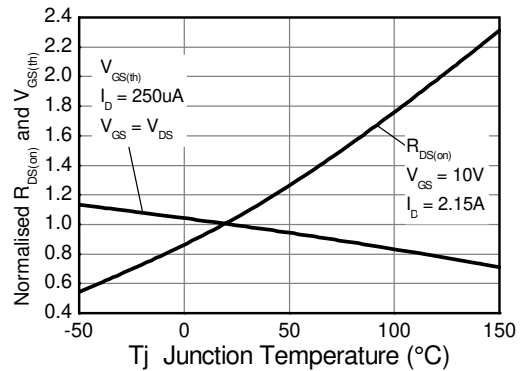
**Output Characteristics**



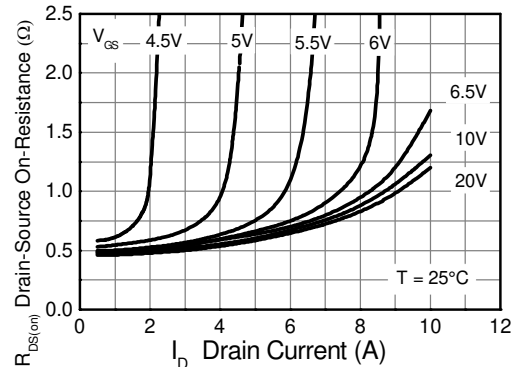
**Output Characteristics**



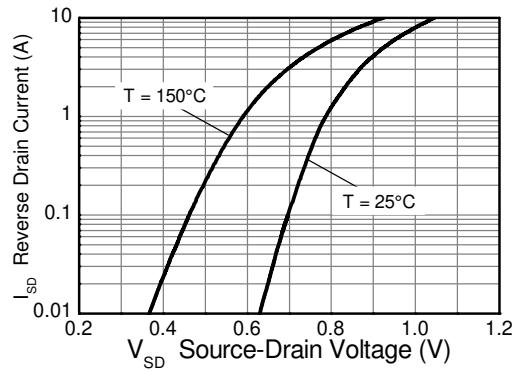
**Typical Transfer Characteristics**



**Normalised Curves v Temperature**

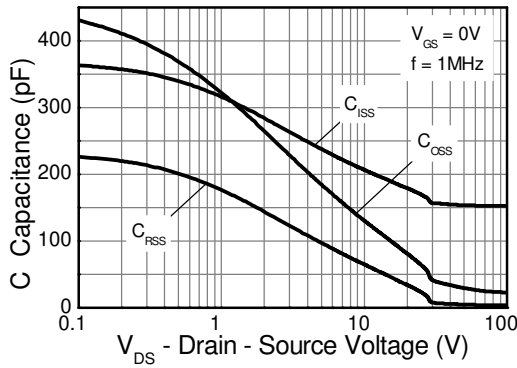


**On-Resistance v Drain Current**

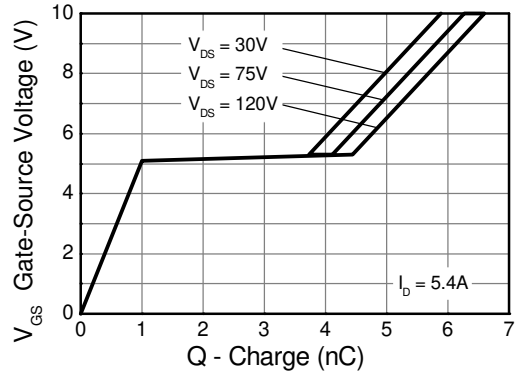


**Source-Drain Diode Forward Voltage**

**Typical Characteristics - continued**

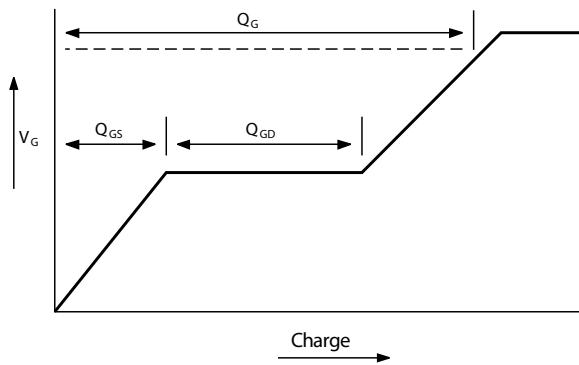


**Capacitance v Drain-Source Voltage**

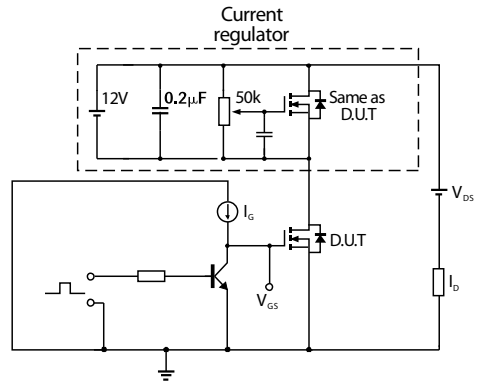


**Gate-Source Voltage v Gate Charge**

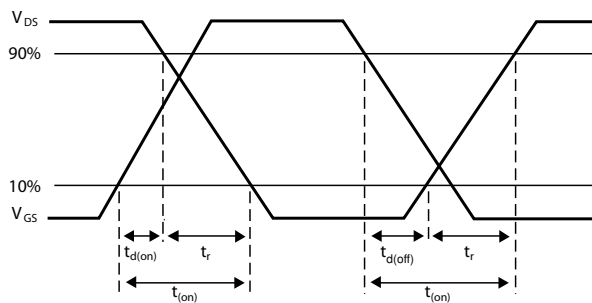
**Test Circuits**



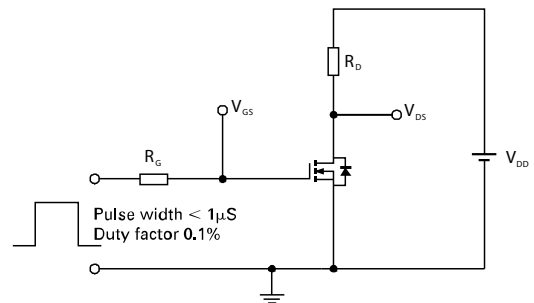
**Basic gate charge waveform**



**Gate charge test circuit**



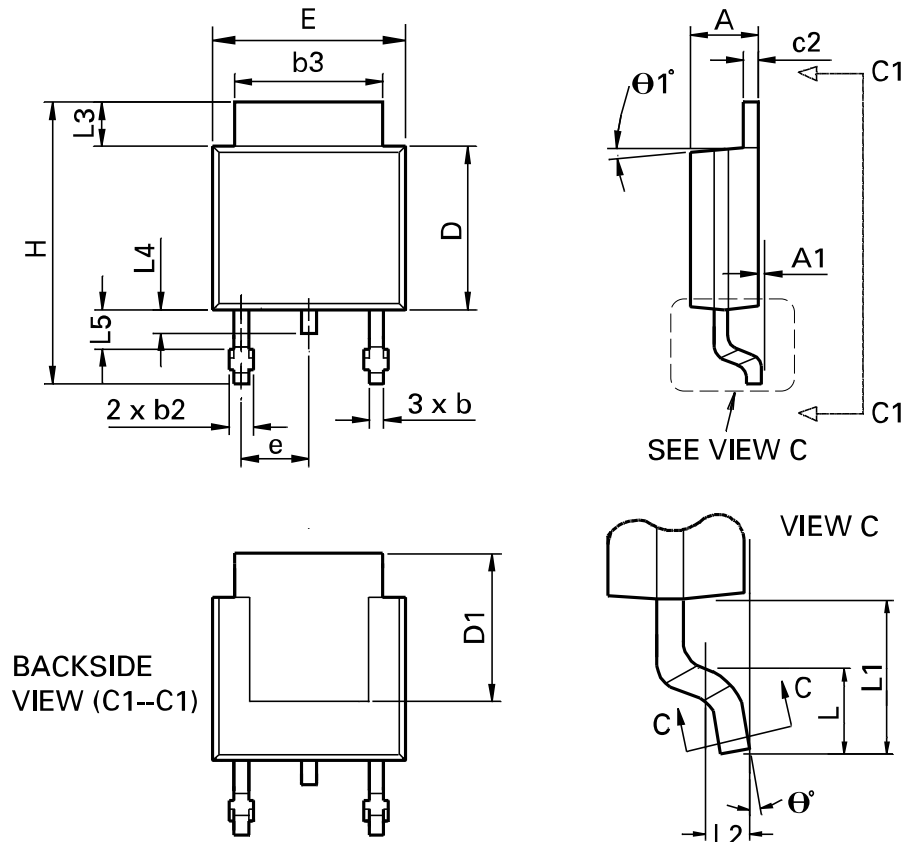
**Switching time waveforms**



**Switching time test circuit**

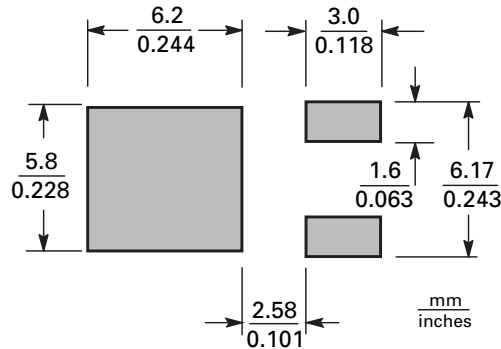
**ZXMN15A27K**

**Package Outline Dimensions**



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min	Max	Min	Max		Min	Max	Min	Max
A	0.086	0.094	2.18	2.39	e	0.090 BSC		2.29 BSC	
A1	-	0.005	-	0.127	H	0.370	0.410	9.40	10.41
b	0.020	0.035	0.508	0.89	L	0.055	0.070	1.40	1.78
b2	0.030	0.045	0.762	1.14	L1	0.108 REF		2.74 REF	
b3	0.205	0.215	5.21	5.46	L2	0.020 BSC		0.508 BSC	
c	0.018	0.024	0.457	0.61	L3	0.035	0.065	0.89	1.65
c2	0.018	0.023	0.457	0.584	L4	0.025	0.040	0.635	1.016
D	0.213	0.245	5.41	6.22	L5	0.045	0.060	1.14	1.52
D1	0.205	-	5.21	-	$\theta 1^\circ$	0°	10°	0°	10°
E	0.250	0.265	6.35	6.73	$\theta^\circ$	0°	15°	0°	15°
E1	0.170	-	4.32	-	-	-	-	-	-

**Suggested Pad Layout**



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